

# Hemobilia Complicating Hepatic Cryosurgery

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We describe a 58-year-old man who developed hemobilia following hepatic cryotherapy. This was complicated by acute pancreatitis and recurrent cholangitis, which necessitated multiple endoscopic procedures (including biliary stenting) for successful management. As cryotherapy becomes more widely applied in the management of patients with liver tumors, it is essential that surgeons safeguard against the development of arteriobilious fistulae. *J. Surg. Oncol.* 1998;67:130–133. © 1998 Wiley-Liss, Inc.

**KEY WORDS:** hepatic cryotherapy; endoscopic retrograde cholangiopancreatography (ERCP); hemobilia complications

## INTRODUCTION

Hepatic cryotherapy represents a major advance in the management of primary and secondary liver tumors. In addition to permitting nonanatomic ablation of lesions adjacent to or involving vital vascular or ductal structures, it permits destruction of tumors in patients with limited hepatic parenchymal reserve (i.e. cirrhotics). Under these circumstances the tumor is destroyed and left in situ to be subsequently resorbed by the adjacent hepatic tissue. Whereas a 1–2 cm rim of uninvolved adjacent liver is also frozen to provide a potentially curative ablative margin, this typically sacrifices less normal liver that would be removed during resection. The risk of postoperative hepatic failure is thus substantially lessened [1]. This is the first reported case of postcryosurgery hemobilia complicated by acute pancreatitis and cholangitis.

## CASE REPORT

A 58-year-old Vietnamese male presented with right upper quadrant abdominal pain and abnormal liver function tests. Serologic testing demonstrated prior infection with hepatitis B. The serum alphafetoprotein was normal. A CT scan demonstrated an 8 cm mass in segment VI of the liver. The patient underwent diagnostic laparoscopy to exclude extrahepatic spread followed by laparotomy. At operation the tumor was observed to be extending into segment V and the uninvolved liver was grossly abnormal, consistent with micronodular cirrhosis. It was felt that the patient lacked the parenchymal reserve to tolerate a right hepatic lobectomy. Cholecystectomy and

cryotherapy of the hepatic tumor were performed using two freeze/thaw cycles with combinations of a 10 mm deep probe and surface paddle. Biopsy of the tumor revealed features of a mixed tumor comprised of hepatocellular carcinoma and cholangiocarcinoma. The patient's immediate postoperative course was uneventful, and he was discharged in good condition. A follow-up CT scan 3 months later demonstrated a 4 cm low attenuation region at the site of the liver tumor that was felt to represent postcryosurgical changes.

Two months later the patient was admitted with acute pancreatitis, hyperbilirubinemia, and stools that showed occult blood. An upper gastrointestinal endoscopy revealed gastritis and a bezoar that was removed. The patient rapidly improved and was discharged without further diagnostic evaluation or intervention. A CT scan prior to discharge demonstrated fullness in the pancreatic head, an abnormal-appearing (in retrospect probably clot-filled) common bile duct and an interval increase in the liver lesion, which now appeared to be involving the adjacent posterior abdominal wall (Fig. 1). One month later, with the suspicion of recurrent tumor present, a percutaneous biopsy was obtained and demonstrated atypical cells consistent with residual carcinoma.

The patient was subsequently re-explored and was found to have a 4 cm mass primarily in segment V abut-

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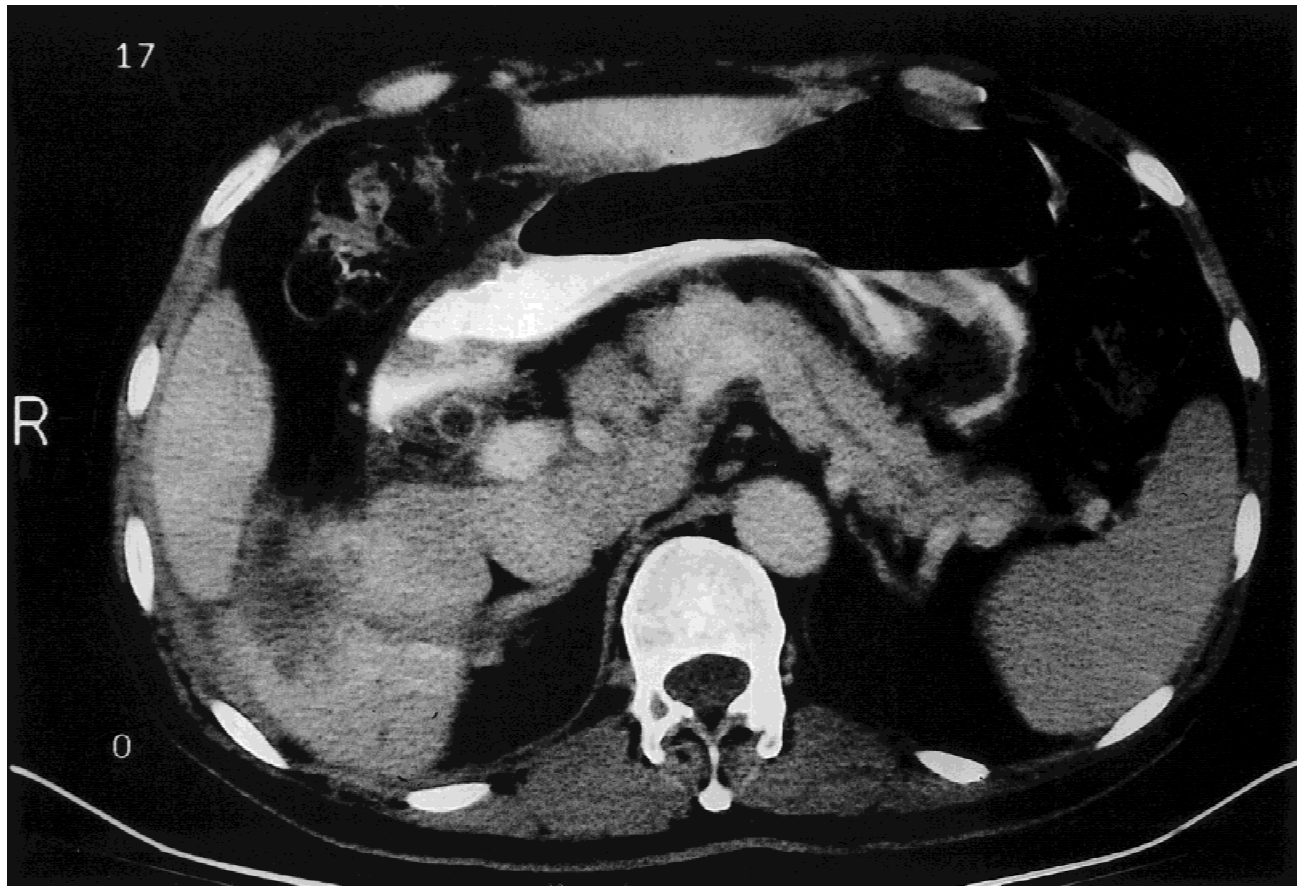


Fig. 1. CT scan showing prominent, clot-filled common bile duct and abnormality of posterior abdominal wall.

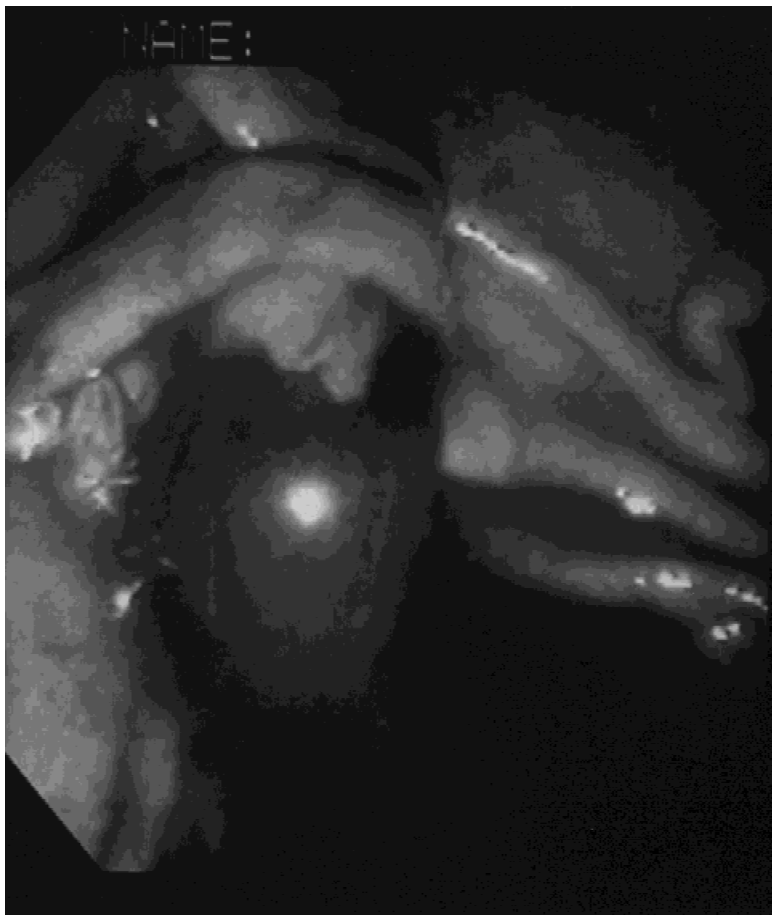


Fig. 2. Endoscopic photograph of hematoma extruding from ampulla of Vater.

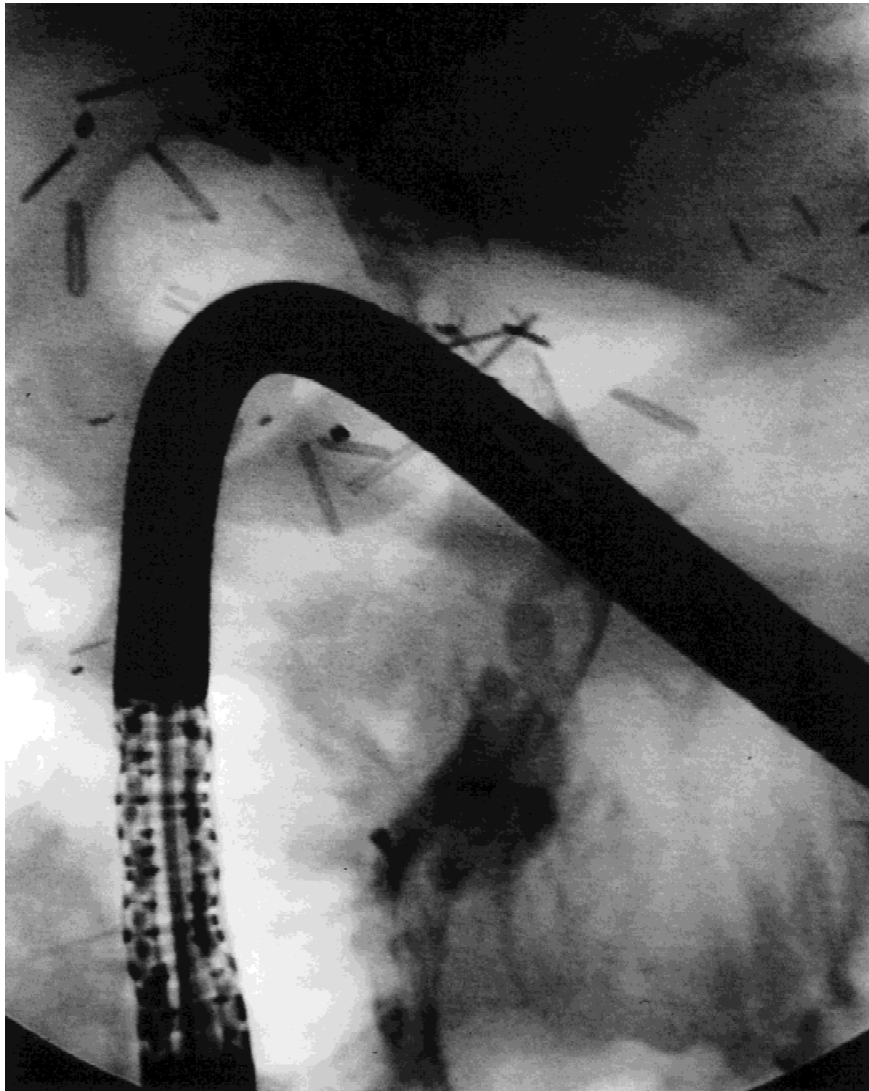


Fig. 3. Endoscopic cholangiogram demonstrating multiple filling defects in the common bile duct.

ting the region of the intrahepatic main right hepatic duct. There were inflammatory changes involving the posterior abdominal wall near segment VI. Repeat cryotherapy was performed with the "iceball" extending into the uninvolved liver adjacent to the main right hepatic duct. Postoperatively the patient made an uneventful recovery and was discharged on the sixth postoperative day. An intraoperative biopsy failed to document residual viable tumor.

One month later he was readmitted with another episode of acute pancreatitis. An endoscopic retrograde cholangiopancreatography (ERCP) performed during that admission detected a blood clot extruding from the ampulla of Vater (Fig. 2). The cholangiogram demonstrated multiple filling defects in the common bile duct (Fig. 3). A papillotomy was performed and additional clot was extracted. Two weeks later he was readmitted with ascending cholangitis and GI bleeding. Following red blood cell transfusions and intravenous antibiotics,

the patient rapidly improved and plans for a hepatic arteriogram were aborted.

Two months later a follow-up ERCP demonstrated a filling defect at the confluence of the main hepatic ducts. Four days after that procedure, he was readmitted with recurrent cholangitis. Biliary endoprotheses were placed in the right and left ducts and the patient made an uneventful recovery. He was last seen in follow-up 4 months later and was without further episodes of abdominal pain, GI bleeding, or jaundice. A subsequent CT scan demonstrated no evidence of recurrent disease.

## DISCUSSION

Iatrogenic hemobilia, although relatively uncommon, is a known complication following hepatobiliary surgery, percutaneous liver biopsy, and transhepatic cholangiography [2]. More common complications of hepatic cryotherapy include hepatic failure, biliary leaks, probe site bleeding, acute tubular necrosis, thrombocytopenia, co-

agulopathy, pleural effusions, and myoglobinuria [3]. It is probable that the mechanism of injury in this patient is a postcryotherapeutic arteriobiliary fistula between a branch of the hepatic artery and the right hepatic duct. Since an arteriogram was not included in this patient's care, the exact nature and location of the arteriobiliary fistula are somewhat speculative. Recurrent tumor could not be histologically verified, but it is possible that the fistula resulted from recurrent tumor rather than cryotherapy. Although the patient's favorable subsequent clinical course would argue to the contrary, the presence of a persistent filling defect in the common hepatic duct does not allow us to exclude the possibility of recurrent tumor with confidence.

Recurrent episodes of hemobilia are the norm, although spontaneous resolution can occur. Sandblom and Mirkovitch [4] have suggested that persistence of the arteriobiliary fistula may be due to impairment of wound healing in the presence of bile. Given this, we caution clinicians considering delay or omission of angiography in the management of these patients. Angiography is the most reliable diagnostic and therapeutic modality currently available in the management of patients with hemobilia.

As hepatic cryotherapy gains rapid acceptance as a therapeutic modality rivaling resection in efficacy, the procedure is being performed by increasing numbers of surgeons with varying degrees of experience. Utmost care should be exercised by surgeons performing this procedure. Continuous ultrasonographic monitoring of the extent of freezing should be performed in all patients. In locations where liver tumors abut major vascular or ductal structures, consideration of biliary thermoprotection should be entertained [5]. With such precautions it is possible that some biliary complications of cryotherapy can be avoided.

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